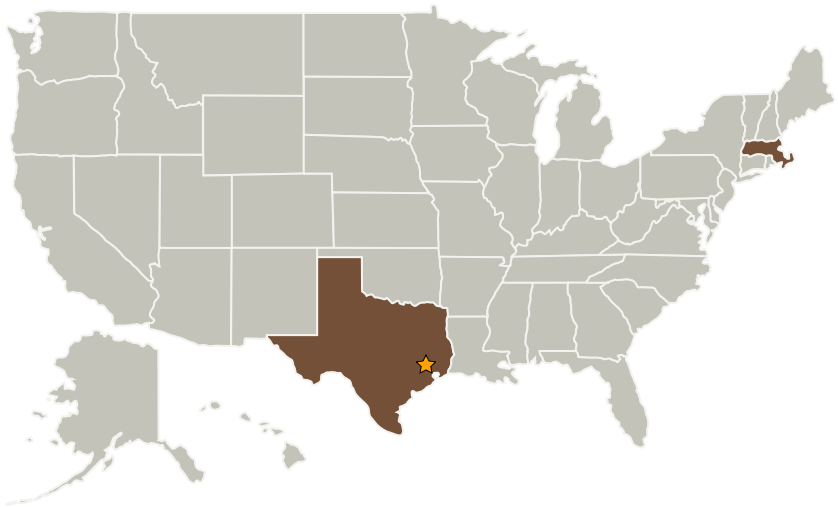
Flexible High-Barrier Polymers for Food Packaging, Phase I

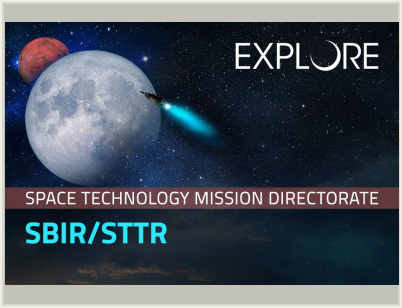
Completed Technology Project (2009 - 2009)

Project Introduction

The development of a polymer laminate with water and oxygen barrier properties suitable for food packaging and preservation on 3-5 year manned space exploration missions is proposed. The laminate is a multilayer structure comprising polymer and inorganic dielectrics that will provide near-hermetic encapsulation of food items for the duration of these missions. The properties and expected benefits of the multilayer packaging include: oxygen transport rate of <<0.005 cc/m2-day; water transport rate of <<0.005 g/m2-day; suitable for retort, microwave, and high pressure sterilization (>135oC); specific weight <40 g/m2 for a 34 micron thick laminate meeting H2O and O2 permeation goals; inorganic content of <2.4 g/m2; contains no metal foils; and, a higher strength-to-weight ratio than current barrier materials, providing a thin high-strength laminate with sufficient ductility for packaging and sealing operations. In Phase I, polymer laminates will be fabricated and characterized by oxygen and water permeation tests to demonstrate barrier properties. Mechanical and accelerated testing, using steam sterilization and high-temperature water immersion, will be included to demonstrate the suitability of the laminate for packaging applications. In Phase II, the manufacturing process would be scaled-up and methods for forming packages, vacuum and inert gas packaging; and heat sealing addressed.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
EIC Laboratories, Inc.	Supporting Organization	Industry	Norwood, Massachusetts

Primary U.S. Work Locations	
Massachusetts	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.2 Mission Infrastructure, Sustainability, and Supportability
    - TX07.2.1 Logistics Management